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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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DISEASES of the NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Rhythmic Sensory Bombardment Therapy (R.S.B.T.):

(A New Treatment for Patients With Psychiatric Disorders)

JOHN W. LOVETT DOUST, M.B., B.S., and ROBERT A. SCHNEIDER, M.D.

Toronto, Canada *Oklahoma City, Oklahoma*

In psychiatry, "new" methods of treatment are relatively common. It requires but the ingenuity of a chemist and the resources of the drug company to place on the market a new panacea for states of anxiety or depression and, if the product is supported by favorable reports of its use in mentally ill patients, much time-consuming clinical research is thereby entailed to investigate the effects of the compound and assign it to its proper position in the psychiatrist's therapeutic armamentarium. As the clinician is only too well aware, most promising stars in such a galaxy eventually prove to be meteorites and disappear forever after such trials.

The very nature of many psychiatric disorders precludes assignment of obvious and direct causation, in the sense in which etiology is used in other branches of medicine. Because of this, treatment often has to be based on the relief of symptoms rather than the attempted release from an underlying cause. Certain therapies do exist which purport to be directed towards the removal of a cause but, as for example with the case of psychoanalysis, the causation is a series of philosophic postulates rather than a variable capable of quantification in scientific terms. Contributory causation, exemplified by the multi-dimensional psychobiological approach of Meyer, while it has brought new order and an expectant outlook to psychiatry, is none the less by its very nature lacking in ability to unify the scientific understanding of its problems and thus aid both in the search for common factors responsible for the induction of mental disorders and for methods of combating them. Apart from psychotherapy, most of the efficient techniques of treatment in common use in psychiatry today have sprung from empiric or frankly pragmatic sources: those that have painstakingly been developed from rational inductive scientific hypotheses have frequently proved worthless when put to the crucial clinical test. Such a dilemma of course in no way invalidates the scientific approach: it means merely that the hypotheses were incorrect in the first place, or at least sufficiently so to render efforts at experimental validation too full of pitfalls for adequate appraisal.

Attempts have recently been made (Lovett Doust, 1953a and b) to distill some of the physiologically relevant common factors present in existing treatments offering relative success in the therapy of mental disorders. This present contribution represents a logical continuation of that former study and introduces a new treatment based on those principles found to be responsible ones

From University of Toronto Medical School and Research Laboratories, Toronto Psychiatric Hospital, and University of Oklahoma Medical School and the Oklahoma Medical Research Foundation.

This work was initiated while the authors held research appointments at the Institute of Psychiatry, Maudsley Hospital, London. It was continued simultaneously in their subsequent trans-Atlantic locations at Toronto, Canada and Oklahoma City, Oklahoma.

in the light of the evidence surveyed. In it we shall try to outline the reasoning which lies behind the development of the treatment, the features it shares with other accepted psychiatric therapies and its theoretical advantages over them, and we shall conclude with a brief statement as to the results achieved in a group of 50 patients suffering from a variety of psychiatric disturbances. Subsequent articles are planned which will deal in greater detail with the clinical and physiological effects of rhythmic sensory bombardment therapy.

Factors and Mechanisms Common To Successful Treatment

In the reviews previously referred to, evidence was brought forward in support of a specific application of Selye's (1950) hypothesis of the cycle of changes known as the general adaptation syndrome. It was shown that, at least insofar as the oximetrically monitored arterialized capillary oxygen saturation is concerned, successful therapies induce in the patient an initial stage of *shock* characterized by anoxaemia which is followed by a stage of *counter shock* (the "rebound phenomenon") with the cessation of action of the stressor agent and which is typified by a homeostatic rise in the capillary blood-oxygen saturation to levels above the pre-shock resting values. The third phase is a stage of *resistance* in which the oxygen saturation levels fall once again, but this time differentially and to values in direct relationship with the clinical benefit of the treatment to the patient and his resulting level of awareness.

As an example of these happenings the sequence of events accompanying deep insulin coma therapy may be quoted (Lovett Doust and Schneider, 1952a). A spectroscopic oximetric investigation of thirteen schizophrenic patients undergoing insulin shock treatment was made. Each patient was individually and continuously studied for the duration of a typical day's treatment session, i.e. over a period of about nine hours. It was found that as the level of awareness fell gradually away following the insulin injection, this was accompanied by a progressive anoxaemia ("shock") which was maximal with the onset of clinical coma and was dramatically reversed by the intravenous or intragastric glucose interruption. It was further seen that the blood oxygen saturation rose in response to the glucose to values well above the pre-insulin resting level ("counter-shock") and only settled again to their former levels some 10-30 minutes later. Significant however was the finding that, in those patients who showed clinical improvement from the therapy, the final oxygen saturation values were sensibly higher (and closer to the normal range) whereas in those other patients who evinced no such change, the return was only to similar pre-injection levels from which they started ("resistance"). Similar alarm reaction responses in the field of the oximetrically monitored capillary blood oxygen saturation have also been noted during psychiatric treatment by histamine (Lovett Doust, 1953b) and psychotherapy (Lovett Doust and Leigh, 1953); they may be inferred for other therapies such as E.C.T. and metrazol shock, prolonged sleep, fever and intravenous acetylcholine (Lovett Doust, 1953a).

It must of course be clearly stated that we are not assuming that this pattern of events as described is the only one contributing to therapeutic change. Among others considered relevant in the review referred to (Lovett Doust, 1953a) is the maturational effect of successful treatments but this and other variables are not our concern in the present report. Here we are at pains to point out that one variable apparently common to all successful therapies consists in the invariable induction of an initial capillary anoxaemic stress, followed by an hyperoxaemic rise in the oxygen saturation values with the cessation of action of the stressor agent, and a final phase in which the saturation levels fall again to reach a stable baseline, the height of which is in direct relationship with the benefit of the treatment to the illness of the patient and to the dyscrasia of his awareness. And it should be emphasized that the differences between such treatments responsible for this cycle of physiological changes are of two principal orders, viz., the degree of the initial anoxaemia which is a function of the intensity of the shock or stressor agent employed and, secondly, the time during which the stress is allowed to act. In

the therapies already mentioned a wide range of variation in these factors may be seen, the extent of the stressor agent (and hence of the shock-phase anoxaemia) in the case of psychotherapy or insulin sub-coma being less than that induced by, e.g. E.C.T. or full insulin coma, while the duration of action of the stress ranges from a matter of seconds in E.C.T. or intravenous metrazol up to half an hour or more in the case of deep insulin therapy.

From this point of view it can thus be seen that an ideal treatment in psychiatry should be able to provide a reasonably elastic range of possible stress potential, along with a duration of action which can be modified at will to suit the particular needs of the patient's malady. There are however other factors to be considered. An ideal treatment should also be capable of predictably reversing the pathoplastic features of the disorder within a reasonably short time; it should be capable of being administered by technically trained personnel (thus relieving professional psychiatrists of other than consultative work); it should be safe (and free from the possible hazards of e.g. E.C.T., insulin and the other "shock" therapies); it should be capable of being given to individuals or groups in courses of variable length, such courses being repeatable as required; it should not require more than minimal co-operation from the patients undergoing it; and it should be relatively non-specific and applicable to a wide range of psychiatric disorders. Table 1 indicates how rhythmic sensory bombardment therapy (R.S.B.T.) matches up in these regards by comparison with other accepted forms of treatment.

TABLE 1

Elective Factors in an Ideal Psychiatric Treatment and the Coverage Given by a Selection of Existing Therapies. Comparison with R.S.B.T.

Treatment	Short	Repeatable **ad lib.**	Free from danger	Skilled nursing not required	Non-specific	Group work possible	Patient's co-operation not required	Cheap to administer
R.S.B.T.	x	x	x	x	x	x	x	x
E.C.T.	x	x					x	x
Insulin subcoma	x	x					x	
Insulin coma							x	
Continuous sleep	x				x			
Lobotomy	x						x	
Drugs		x		x	x			
Supportive psychotherapy		x	x	x	x	x		
Psychoanalysis			x	x		x		
Narcoanalysis								

The Effects of Rhythmic Sensory Stimulation on Oxygen Metabolism

Recent investigations (Lovett Doust, Schneider and Hoenig, 1952) have suggested a relationship between the oximetrically monitored arterialized capillary blood oxygen saturation and the frequency intermittency of rhythmically applied photic and sonic stimulation. It was shown that the saturation levels may be raised or depressed within a fairly wide range, or left unaltered at will, by the choice of certain stimulation frequencies of suitable intensity and critical for the individual subject examined. The characteristics of the response of any subject, healthy or mentally ill, are determined by the establishment of a profile in which the oxygen saturation values are plotted against the stimulation frequencies evoking them the range of the latter commonly falling between 1 and 40 f./sec. The resulting profile is identical whether intermittent light or sound is the modality of stimulation used and it consists in most healthy subjects of primary and harmonic curves of progressive capillary anoxaemia between the stimulation frequencies of 1 and 8, and 12 and 17 f./sec., together with a tertiary curve of hyperoxaemia in the opposite direction which commences at about 23 f./sec. and rejoins the unstimulated resting level at 30-35 f./sec. No further change in the saturation levels has occurred at stimulation frequencies above 35-40 f./sec. in any healthy subjects examined thus far, although this is not true of patients with certain types of psychiatric disorder.

These findings have since been confirmed and extended (Lovett Doust, Schneider and Harris, 1952). It has been shown that identical results ensue when intermittent tactile stimulation is employed as an alternative to

photic or sonic bombardment, that summative effects are developed by employing two modalities of stimulation simultaneously and that, to some small extent, the saturation changes vary in degree but not in profile pattern with the intensity of stimulation used. It has further been demonstrated that overt psychological changes accompany the changing stimulation frequencies in many subjects. These psychological effects can be classified into deviations of consciousness, e.g. a sleepy state following upon rhythmic stimulation at frequencies inducing capillary anoxaemia (a situation recalling the association previously noted between these two variables—Lovett Doust and Schneider, 1952b); and into changes of affect, e.g. feelings of euphoria being differentiated from those of irritability, apathy, suspiciousness or hostile paranoid ideation in accordance with the relative elevation or depression of the oximetrically monitored saturation values.

Critical Rhythmic Sensory Stimulation As Stressor Agent, and Its Sequelae

If a choice is made of that stimulation frequency which has been found to evoke the maximal capillary anoxaemic response in a given subject, and if that subject is now submitted to continued rhythmic sensory bombardment at that frequency, then it has been found that the capillary anoxaemia persists for the duration of the stimulation. If the duration of stimulation exceeds a period of 5-12 mins. (some individual variation has been noted here) and then ceases, continued oximetric monitoring indicates a steady rise in the oxygen saturation values which climb not only back to the unstimulated resting level but well beyond it, the extent and duration of the "rebound" hyperoxaemia depending, within limits, upon the extent and duration of the previously induced anoxaemia. Finally, the oxygen saturation settles down to its unstimulated resting level once again.

As has been noted, this is the identical cycle of changes found characteristic of treatments of proven value in psychiatry. Its discovery forms the basis of R.S.B.T.

In an emotionally stable healthy subject a single period of such rhythmic stimulation can often be given for an hour or more, and the sequence of oximetric changes followed, with little comment from him save some such remark as, "I didn't mind it, but it wasn't exactly pleasant." In many psychiatric patients however a great variety of psychological, behavioural and autonomic changes have been noted, especially during the phase of capillary anoxaemia. Some examples of these reactions in neurotics have already been published (Lovett Doust, Schneider and Harris, 1952). In psychotics and, in particular in schizophrenic patients prone to hallucinatory episodes, it is sometimes possible to invoke olfactory, auditory and even visual hallucinations at will, and to destroy them along with the patient's responses to them, simply by applying the appropriate stimulation procedure critically applicable to the patient in question. An illustration of these happenings is given in Fig. 1.

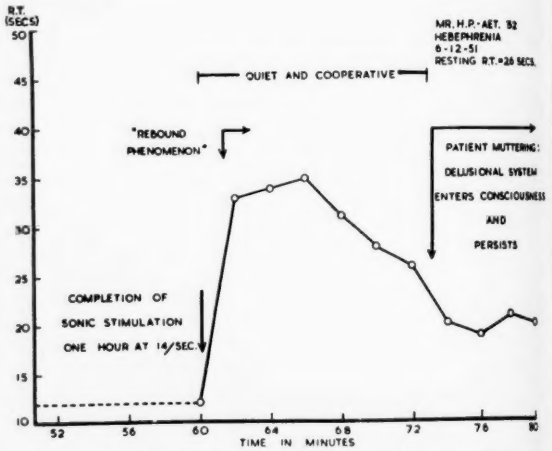

Figure 1. Mr. H. P., aet 36. Hebephrenia. Thought disorder, autochthonous ideation, bizarre delusions, much silly giggling, auditory hallucinations; all for many years. Resting arterialized capillary blood oxygen saturation = 90.6 per cent. (20 R.T. secs) which is capable of depression to 87.6 per cent (10 R.T. secs.) by rhythmic photic stimulation at 14 f./sec. Cessation of such R.S.B. after a one hour period induces the "counter shock" phase shown with a transient rise in the saturation to 95 per cent. (35 R.T. secs.). Note the correspondence between the oximetric status and the changing behavior of the patient.

Therapeutic Effects of Rhythmic Sensory Bombardment in Psychiatry

As has been seen, R.S.B.T. is apparently capable of initiating the primary period of anoxaemic stress, the following phase of countershock (or "rebound phenomenon") and the final stage of resistance typical of the general adaptation syndrome, and also

of E.C.T., insulin coma and other accepted psychiatric treatments: it remains now to be shown that R.S.B.T. possesses similar clinically therapeutic value to the individual mentally ill patient as these other treatments and, incidentally, that the cycle of changes, postulated as a mechanism common to all successful therapies, has scientific validity when R.S.B.T. is employed to exemplify it.

In an attempt to answer these questions a pilot treatment project was set up and the effects of R.S.B.T. have been studied in a group of 51 psychiatric patients.

Case Material

The sample consisted of ten psychoneurotics (3 with anxiety state, 4 with hysteria and 3 with obsessive compulsive symptoms), three examples of psychopathic personality (all of the "paranoid inadequate" type), 15 cases of affective disorder, depressive type (3 endogenous depressions, 10 neurotic depressions and 2 involutional melancholics), 22 patients with schizophrenic reactions (4 cases of dementia praecox simplex, 2 catatonic schizophrenics, 4 hebephrenics, 7 paranoid schizophrenics and 5 paranoid states) and one patient addicted to barbiturate drugs. Twenty one patients were treated in London, nineteen in Toronto and eleven in Oklahoma. Of the total group, 22 were males and 29 were females; their ages ranged from 18 to 68 with a mean of 31.6 years. The diagnoses of the patients were determined by the consensus of at least two competent psychiatrists. Adequate clinical investigation was carried out prior to reception into the treatment sessions.

Selection of Patients

No attempt was made to select any particular class of patient other than those fulfilling the following criteria: they should be ambulant and sufficiently co-operative to attend at the treatment room when required; if out-patients, their affairs should permit them to attend the clinic daily at the appointed time for at least a continuous two-monthly period; and, during the assessment period and the treatment course, all other forms of psychiatric therapy should be withheld.

In point of fact our material was far from naive. Many of the psychotic patients had received courses of insulin coma and/or E.C.T., and nearly all the neurotic and psychopathic patients had been given psychotherapy, in many cases intensively and for periods of six months up to two years. Referring clinicians were encouraged to submit such cases to us rather than patients newly admitted to hospital not only because they were better investigated but also because their previous unsuccessful treatment provided us with a further yardstick against which to measure the relative success of R.S.B.T. The cases briefly outlined in the Appendix to this report contain an example of this latter point.

Procedure of Investigation

Prior to the treatment session proper, the patients were assessed both clinically and physiologically. An interview was undertaken, and monitored by spectroscopic oximetry (Lovett Doust and Leigh, 1953), at which significant events in the life situation of the patient were discussed and the associated variations in the capillary blood oxygen saturation recorded. This provided us with some indication of the extent and quality of the emotional setting in which the illness had occurred, and enabled an estimate to be made of the impact it had had on the homeostatic adequacy of the patient. Additionally, day by day measurements were made of his resting oximetric status, and responsivity score to a standardized apnoeic stress, over a period of at least a week in order to determine the "natural" fluctuations to be anticipated from the routine of leaving the ward, coming to the laboratory and being in contact with the new equipment and personnel associated with it. On the occasions when group treatment was carried out, this initial 1-2 weeks assessment period also provided a control for the interpersonal psychological realignments necessitated by bringing 6-8 people together for a significant portion of the day and which might be pre-supposed as a factor in their treatment. From the adjustments due to such variables as these and the variations in the course of the illness, it was possible to observe a final baseline which represented the resultant of all of them and which could be expressed in terms of the resting capillary

oxygen saturation and the stress responsivity score partly dependent upon it. The significance of these dimensions in terms of the nature and quality of the mental illness, and in terms of the associated level of consciousness of the patient, has already been referred to (Lovett Doust, 1952a). If no relatively stable baseline had made its appearance by the end of the 1-2 weeks observation period, treatment was delayed up to one month and was then begun. This latter circumstance was very unusual, most patients' recordings settling down to variations within the limits of experimental error well within the 1-2 weeks period of observation.

Objectivity was added to clinical impression by a number of other psychophysiological indicators of the type and level of mental functioning. The Malamud-Sands psychiatric rating scale (Malamud and Sands, 1947) was employed as a quantifiable measure of degree of disturbance, the Minnesota Multiphasic Personality Inventory as an index of the matrix of morbid components of the personality, the Wechsler-Bellevue intelligence test as an estimate of the level of cognitive awareness, and the E.E.G. as an indication of the dominant cortical rhythmic activity. The results of these tests were interesting but do not concern our principal theme here: they will be reported elsewhere.

A final necessary assessment procedure was the determination of the optimal critical frequency of stimulation needed to produce maximal anoxaemic stress. This was measured routinely in all patients by individually determining their profile oximetric response to rhythmic sensory photic stimulation at each frequency from 1-40 f./sec. (Lovett Doust, Schneider and Hoenig, 1952; Lovett Doust, Schneider and Harris, 1952). In the case of most subjects two such critical frequencies are available, the one being a first harmonic of the other; in many patients the actual frequencies evoking maximal anoxaemia lie in the ranges 3-7 and 13-17 f./sec. but some few subjects differ markedly from these ranges. It appears to be absolutely necessary not only initially to determine the oximetric profile and to choose that stimulation frequency inducing the greatest oximetric effect but also to ensure that, when group treatments are undertaken, all patients in the group shall have closely approximating profile characteristics. Conversely, it seems to matter little neither whether the stimulation frequency evoking the initial or the harmonic oximetric depression is chosen for use in treatment nor whether the modality of stimulation is photic or sonic.

Once the course of treatment had commenced patients were assessed daily immediately before the stimulation in respect of their resting capillary oxygen saturation and their responsivity score. Since both of these estimates are influenced by R.S.B.T., their daily variation monitored *prior* to treatment provides an indication of the amount of change "held" from the stimulation received on the previous day.

Technical Methodology

Arterialized capillary oxygen saturation levels were studied by means of the "reduction time" technique of discontinuous peripheral spectroscopic oximetry (Ray, 1946; Lovett Doust, 1952a) with the histaminized cutaneous minute vessels of the finger nail fold as the site of examination. Rhythmic sensory stimulation in its photic mode was provided by the square wave output of a General Radio high intensity "Strobolux," triggered to give intermittency at the desired frequency by the special low speed model of General Radio's "Strobotac" stroboscope. In its sonic mode, use was made of the simple condenser discharge type of stimulator described in a previous communication (Lovett Doust, Schneider and Harris, 1952) which has a maximum power output of approximately five watts.

Treatments were carried out in the same room as that in which the assessment procedures were undertaken. They were given individually or to groups of up to eight patients at a time. In the latter case no effort was made to select mutually congenial patients for group treatment but it was found desirable to treat only one sex at a time.

The patients were received in the clinical laboratory and each in turn sat at the examiner's table for the daily assessment procedure to determine his resting oximetric status. They were provided with comfort-

able chairs and sat facing the stroboscopes as the examiner switched on the instruments, darkened the room and retired elsewhere for the hour's session. Patients were instructed that they could talk among themselves and smoke if they wished, but they must keep their eyes on the flashing lights and not go to sleep. From time to time a check was made by the examiner to ensure that these conditions were being fulfilled. At the completion of the sixty minutes stimulation, the examiner conducted the patients back to their wards and reminded them of their next day's appointment.

Treatment Schedule

Inherent in the decision to investigate the possible therapeutic value of R.S.B.T. on a rather limited group of 51 patients was the necessity of holding constant as many variables as possible. Some such variables were the duration of an individual treatment or period of stimulation, the number of times it should be repeated to constitute a course of therapy and the number of such treatments per day or per week. Preliminary work suggested that, up to a point, the extent and duration of the phase of countershock (the rebound phenomenon) are related to the duration of the stress-inducing stimulation and that, although this reaction can be measurably elicited by a matter of ten minutes sensory bombardment, its quality and persistence are vastly improved by stimulation enduring for 60 minutes. An arbitrary decision was taken therefore that, for the purposes of this pilot investigation, an individual treatment would last for one hour, six treatments should be given on a daily basis per week and that twenty such treatments should constitute a course.

Control and Assessment of Some Validating Variables

The clinical effects of treatment in psychiatry are notoriously difficult to judge objectively and this is the reason, perhaps, that the socio-economic factor of getting the patient out of hospital and back to his home has been so widely used in the past as the most appropriate estimate of remission of the illness. We have employed this criterion as one of factors influencing the interpretation of our results: it must be emphasized however that follow-up studies on the present material are far from complete. The best follow-up group is the London material concerning which information is available for upwards of 24 months. The American and Canadian material is only a few months old: all one can say about these patients is that a percentage of them have been enabled to leave hospital.

In attempting to evaluate the response of patients to R.S.B.T. we have distinguished three categories, viz. (1) "C" or a complete or fairly complete remission of the disorder resulting in the discharge of the patient from hospital without further treatment. (2) "I" or a definite improvement in the patient's condition and associated with his ultimate later discharge from hospital, R.S.B.T. perhaps making it possible for him to benefit from psychotherapy or improving his empathy or self-regard. (3) "N.C." in which no observable change comes about as a result of the treatment. And it should be observed here that no worsening of any patient's condition has yet been found following R.S.B.T.

In the general management of the patient during R.S.B.T. sessions possible preventable interfering variables were scrupulously avoided. To the patients the procedures involved were described as "tests" or "investigations," no reference to a possible therapeutic effect being made. Apart from the initial oximetric interview (undertaken at the commencement of the preliminary assessment, and hence a clear week before treatment commenced) no psychological probing, history taking or emotional interference was used, every effort being made to maintain a neutral attitude towards the patient. Occasionally a curious patient would ask questions about the procedures involved and in these cases correct answers would be given, but in such a way as to discourage the patient from drawing the examiner into a detailed discussion of their possibilities.

In a sense each patient acted as his own control throughout the series for the results of the pre-treatment assessment period could be directly compared with any gains made during the following weeks. Additional cluded the daily oximetric assessment of a second untreated group of 25 patients for

periods of upwards of two months; the oximetric effects of a course of R.S.B.T. on a third series of four healthy human subjects who were studied in precisely the same fashion as the patient; and fourthly the completion of a twenty-day course of R.S.B.T. in one patient deliberately employing a critical stimulation frequently found to have no influence on his oximetric status.

A further control has been referred to already in the section dealing with our method of sampling. Whenever possible patients were selected whose illness was tending to run a chronic course, whose condition was considered by their clinicians to have a poor prognosis, and in whom treatment, whether by physical or psychotherapeutic means, had already been carried out without effective response or had reached a stalemate.

In every case the results of these control procedures were in accord with both clinical and physiological expectation. No apparent clinical or objective benefit accrued to the subjects and comparison of their protocols with those of the sample formally treated with R.S.B.T. in accordance with the prescription given in this report was uniformly striking.

TABLE 2—*Results of Rhythmic Sensory Bombardment Therapy in 51 Patients and 5 Principal Diagnostic Groups.*

Diagnostic Group	N	Mean age (years)	Age range (years)	Results of R.S.B.T. C	I	NC
Psychoneurosis	10	33.6	18-52	5	5	0
Psychopathy	3	25.0	19-32	3	0	0
Drug addiction	1	39.0	-	0	0	1
Depression	15	32.7	19-52	12	3	0
Schizophrenia	22	30.8	19-68	8	5	9
Totals	51	31.6	18-68	28	13	10
Per cent. of total				54.9	25.5	19.6

RESULTS

A. Clinical

These are listed in Table 2. It will be seen that rather more than half the sample of 51 patients obtained a good remission as a result of their course of R.S.B.T., some 25 per cent. were "improved" while no lasting benefit accrued to the remaining 20 per cent. Among the larger diagnostic groups, the schizophrenic patients fared the worst, the remission rate reaching only 35 per cent., while nearly half were unchanged. Patients with affective disorders tended to do well, over 80 per cent. achieving good remissions; the neurotics and psychopaths also responded favourably.

TABLE 3—*Results of R.S.B.T. on the Subclassifications of the Major Diagnostic Groups of Table 2.*

Diagnostic Group *Subclassification*	N	Mean age (years)	Age range (years)	Results of R.S.B.T. C	I	NC
Anxiety State	3	41.3	34-52	2	1	0
Hysteria	4	29.8	26-34	3	1	0
Obsessive-Compulsive	3	31.0	18-51	0	3	0
Endogenous Depression	3	33.7	20-43	2	1	0
Neurotic Depression	10	29.0	19-52	8	2	0
Involutional Melancholia	2	49.5	48-51	2	0	0
Simple Schizophrenia	4	34.8	29-45	1	1	2
Catatonic Schizophrenia	2	27.0	15-39	0	1	1
Hebephrenia	4	26.5	21-32	1	0	3
Paranoid Schizophrenia	7	30.7	21-50	3	1	3
Paranoid State	5	32.8	19-68	3	2	0

checks were however employed: they in-

Breaking down these major diagnostic groups into their sub-classifications (Table 3), it may be seen that among the schizophrenics much of the improvement was confined to the "paranoid" types, the response of the "constitutional" varieties being less marked. Of the neurotics, the obsessive-compulsive states uniformly showed no striking change while the patients with affective disorders did better if their illness was of the involutional melancholic or neurotic subtypes rather than that of endogenous depression.

TABLE 4—*The Lack of Influence of Extra-diagnostic Possible Variables on the Therapeutic Effects of R.S.B.T.*

Variable	London Group (21)			Toronto Group (19)			Oklahoma Group (11)			Totals (51)		
	C	I	NC	C	I	NC	C	I	NC	C	I	NC
Males	12	0	1	1	2	3	1	1	0	14	3	4
Females	7	1	0	7	5	1	0	4	5	14	10	6
In-Patients	19	1	1	6	4	2	1	5	5	26	10	8
Out-Patients	0	0	0	2	3	2	0	0	0	2	3	2
Individual	2	0	0	1	2	2	1	5	5	4	7	7
Groups	17	1	1	7	5	2	0	0	0	24	6	3
Ages: <21	4	1	0	0	1	0	0	0	0	4	2	0
21-30	8	0	0	6	4	3	1	1	0	15	5	3
31-40	3	0	1	2	2	0	0	1	4	5	3	5
41-50	1	0	0	0	0	1	0	1	1	1	1	2
>50	3	0	0	0	0	0	0	2	0	3	2	0
Totals	19	1	1	8	7	4	1	5	5	28	13	10

In Table 4 the influence of some variables other than those of diagnosis are compared.

B. Physiological

The objective of treatment in this regard was the improvement of the oxidative metabolism of the patient as reflected in his resting capillary oxygen saturation and in his responsivity score to apnoeic stress. Both these variables were monitored daily throughout the treatment course and provided useful indices of the progress attained. Since the daily estimations were made prior to the daily treatment, the results represented the relatively chronic and lasting effects of the preceding periods of R.S.B.T. Any beneficial change noted at such assessments had therefore endured at least for a 23 hour period.

TABLE 5—*Results of R.S.B.T. on Oxidative Metabolism.*

Diagnostic Group	N	*Arterialized Capillary Oxygen Saturation* PRE-TREATMENT			POST TREATMENT			FOLLOW-UP		
		R.T. secs. Mean	s	Equiv. O_2 per cent.	R.T. secs. Mean	s	Equiv. O_2 per cent.	R.T. secs. Mean	s	Equiv. O_2 per cent.
Psychoneurosis	10	26.50	5.06	92.5	36.25	8.28	95.5	40.86	4.82	96.8
Psychopathy	3	29.75	2.28	93.5	38.25	6.20	96.1	38.25	3.11	96.1
Depression	15	29.30	4.30	93.4	41.33	2.05	97.0	40.00	5.79	96.6
Schizophrenia	22	25.37	8.82	92.1	33.32	8.25	94.6	29.27	9.66	93.4

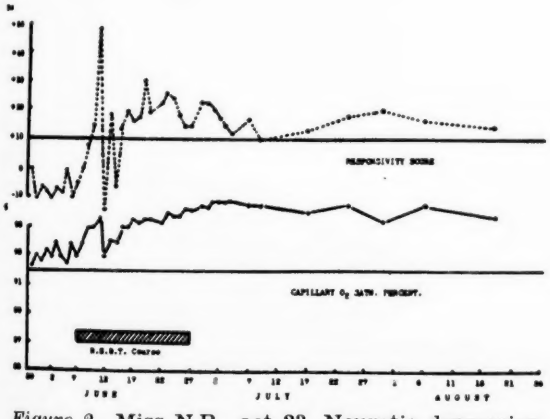

Figure 2. Miss N.R., aet 23. Neurotic depression. Feelings of inadequacy and hopelessness since puberty. Emotionally immature, many specific phobias. No sustained response to daily psychotherapy over a six-months' period. Rapid improvement under R.S.B.T. and recession of most of her symptoms. (Category "C".)

Tables 5 and 6 record the mean changes in these variables accruing from treatment and Figs. 2-5 illustrate typical day by day variations encountered in patients with depressive disorder, with psychopathic personality and with schizophrenia who were undergoing courses of R.S.B.T. Fig. 6 contrasts the favourable results of R.S.B.T. exemplified in the preceding figures with an example of a schizophrenic patient in whom no clinical benefits were derived. It will be seen from Figure 6 that no sustained physiological change occurred either and that the equation of physiological and clinical correspondence is sustained therefore in both directions of change.

TABLE 6—*Effect of R.S.B.T. on the Scatter of Stress Response Scores.*

Diagnostic Group	N	*Oximetric Stress Responsivity Score* PRE-TREATMENT Mean	s	POST-TREATMENT Mean	s	FOLLOW-UP Mean	s
Psychoneurosis	10	—3.50	15.79	+14.00	7.61	+12.75	5.66
Psychopathy	3	+24.75	27.13	+28.50	8.08	+17.25	4.87
Depression	15	+9.23	4.49	+13.77	6.97	+10.75	3.73
Schizophrenia	22	+33.84	19.23	+15.79	9.22	+18.91	16.67

DISCUSSION

Clinically, it would appear from our findings that R.S.B.T. effectively mimics the beneficial results of other accepted treatments in psychiatry. It has certainly shown itself to be no cure-all but the results achieved in the present mixed group of 51 patients, followed as they have been for periods up to 24 months, match up reasonably well with those to be expected from such other orthodox therapies, both physically and psychologically orientated. The same "hard-core" of psychiatric patients apparently resist R.S.B.T. as are impervious to other treatments. What the new therapy appears to achieve however is comparable results with these older treatments and reaches them in shorter time with less danger to the patient.

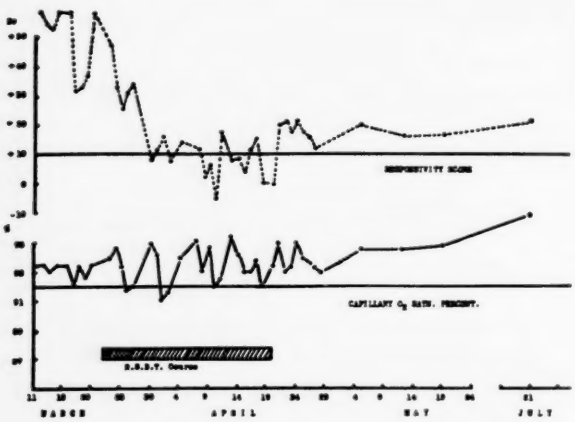

Figure 3. Mr. F.P., aet 29. Paranoid inadequate type of psychopathic personality characterized emotionally by hypersensitivity and anxiety in the face of stress, and physiologically by pathologically high responsivity scores accompanying low normal capillary oxygen saturation values. Symptoms since 1944. Has sought O.P.D. treatment several times. Completed a period of 12 months intensive psychotherapy prior to R.S.B.T. with no alleviation of symptoms. Note the influence of R.S.B.T. initially in expanding the range of the saturation values and simultaneously diminishing the abnormally high scores to within the normal range. Note also that before this latter event occurs, a period in which the score becomes negative ("neurotic") is seen during the first three weeks of April. Good clinical remission after R.S.B.T. Discharged to job (Category "C"), symptom free.

In endeavoring further to interpret the results of the application of rhythmic sensory bombardment to the treatment of psychiatric patients, certain basic assumptions may be made. These assumptions are (1) that the arterialized capillary blood oxygen saturation values, as monitored by spectroscopic oximetry, bear a significant relationship to the mental state of the psychiatric patient and to the quantitative aspect of his functioning level of consciousness (Lovett Doust, 1951; Lovett Doust, 1952a; Lovett Doust, Schneider and Harris, 1952; Lovett Doust and Leigh, 1953); (2) that the Responsivity Score is related to the "physiological efficiency" of the organism and is characteristically impaired in physical ill-health or lack of physical training (Ray, Johnson and Ray, 1946) and also in mental ill-health where it approaches zero or yields a negative value in neurotic patients, or is pathologically high in paranoid states or emotional conditions in which frustration

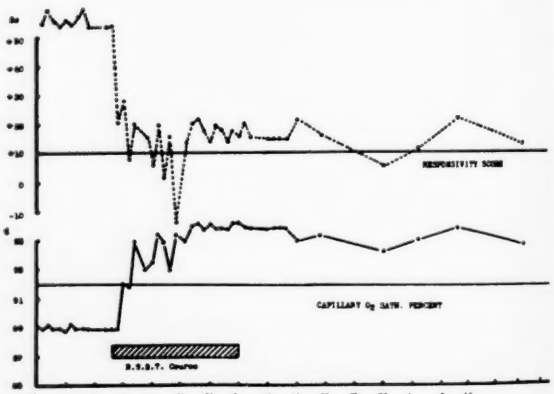

Figure 4. Miss L.D., aet 21. Paranoid schizophrenia with overt symptoms since aet 10. A great deal of apathy; impoverished concentration and affect. Olfactory hallucinations, thought disorder, ambisexuality etc. Note the rapid reversal of the capillary anoxaemia by R.S.B.T. and the transitory "neurotic" phase evidenced by the responsivity score. Excellent clinical response to treatment (Category "C"); discharged free of symptoms and with active heterosexual interest.

tolerance is low (Lovett Doust, 1952a; Lovett Doust and Leigh, 1953); (3) that combined observation of the capillary blood oxygen saturation and the responsivity score in longitudinal fashion over a period of time enables variations in the mental state of the patient to be studied both objectively and quantitatively, with predictions capable of being made of the probable outcome of the patient's illness.

As has been indicated, published work exists which suggests that these assumptions have a reasonable basis in fact although their fundamental importance obviously demands further confirmation before they will be generally accepted. If we may grant them provisionally, they point towards some interesting possible conclusions regarding the correlates of the effects and mode of action of R.S.B.T. Two of these conclusions will be referred to briefly.

First, biological stability demands a series of regular rhythms of function the frequency settings of which are characteristic of a given individual. The actual sources of this rhythmic activity are unknown but their resultants may be recorded as E.E.G. potentials, the heart period, respiratory rate etc. If stress may be defined in terms of change (Selye, 1950), then external environmental influences may be assumed to act as never-ceasing potentially disrupting forces to which the organism is compelled constantly to respond homeostatically in order to maintain an equilibrium and survive. Such forces impinge upon the organism aperiodically but the latter's responses have of necessity to be given in accordance with his inherent ontogenetically determined rhythms. Upon the regularity and frequency of these manifestations of rhythmic activity will depend the individual's relative stability to stress both physiologically and psychologically: and breakdown in the face of stress will be determined not only by the intensity of the forces demanding adaptation but also by the setting of the organism's "physiological clock." It is possible that the effect of R.S.B.T. facilitates a resetting of this clock by deliberately channelling hitherto aperiodic environmental sensory stimuli into a pre-determined frequency pattern which has the concurrent effects of lowering the level of consciousness of the subject and inducing a relative anoxaemia. The cessation of the imposed regularly intermittent stream of stimuli would then be associated with a relative return of consciousness to a new level of function accompanying which is developed a new and perhaps more normal inherent rhythmic activity.

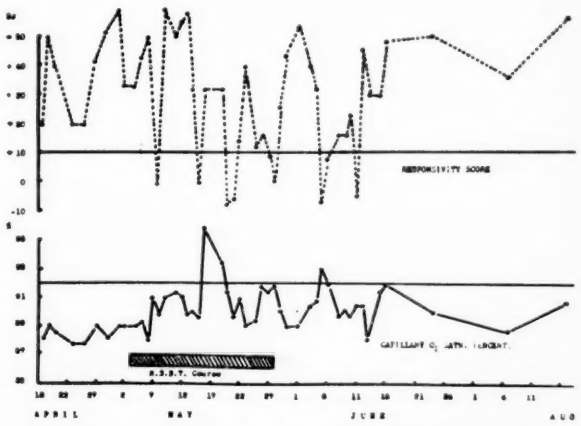

Figure 5. Mr. K.H. aet 26. Catatonic schizophrenia. Progressive personality deterioration since aet 12. Breakdown since 24 months ago with increasing apathy, hallucinations, thought disorder, unpredictable impulsive behavior, stereotypies and ideas of reference. No sustained response to R.S.B.T. Certified. (Category "N.C.")

The second conclusion refers to the standing of the two major modes of expression of psychiatric disorder, neurosis and psychosis, in respect of their relation to each other and to mental health. A quantitative continuum of personality differences, with emotional stability at one end and overt mental illness at the other, represents a way of looking at a psychiatric patient which is more acceptable to most psychiatrists than assuming a qualitative distinction between the mentally healthy and the mentally disturbed. Such an hypothesis receives support both from our oximetric findings in terms of resting status and stress response pattern and from the unifying concept of levels of consciousness which is one of its correlates. The oximetrically-monitored R.S.B.T. findings however take us further than this and beg the question of the relationship of psychotic to neurotic manifestations of breakdown. It has been no uncommon observation in the course of the present study to note the transmutation as treatment proceeds from the physiological accompani-

ments of schizophrenia or psychotic depression into those of a neurotic reaction before these too give place to mental stability. And along with such physiological changes, characteristic clinical pictures have been seen of an intermediate neurotic type of response before a shading off into reactions within the healthy range appear. Further indications of this have also been observed in cases where the transformation remains incomplete and certain patients in our "improved" group who were classified as psychotics before treatment, left the hospital environment dubbed clinically as neurotic reactions.

SUMMARY

(1) Psychophysiological factors common to successful treatment of psychiatric patients are reviewed and the oximetrically-monitored cycle of changes characterizing the alarm reaction to stress is singled out for especial attention. The relationship between capillary blood oxygen saturation and variations in awareness levels and in emotional tension in mentally ill patients is illustrated and the effects of intermittent sensory stimulation as stressor agent are discussed.

(2) On the basis of this hypothesis it is postulated that the principal differences between accepted treatments consist in the intensity of the stress applied and in the duration of time in which it is allowed to act. In an ideal treatment both these factors would be infinitely controllable variables and capable of being predetermined to suit the needs of an individual patient. A treatment relatively capable of such elasticity is R.S.B.T.—rhythmic sensory bombardment therapy.

(3) The method of applying R.S.B.T. and its rationale is explained in detail. A sample of 51 mentally sick patients incorporating most major psychiatric disorders was selected and treatment instituted on their behalf. Adequate control precautions were observed.

(4) Clinically, results showed that, with a follow-up period of up to two years, fifty-five per cent. of the patients obtained a good remission from their illness as a result of R.S.B.T., a further 25 per cent. were improved while the remaining 20 per cent. remained unchanged. Paranoid, depressed and psychopathic patients seemed to do best, constitutionally schizophrenic and obsessive-compulsive patients less well. Sex, age and other variables appeared unimportant. Physiologically, oxidative inadequacy improved in linear relationship with the evidence of clinical change and oximetric determinations proved themselves a useful objective check on clinical impression.

(5) A short discussion of some of the implications of these findings is presented.

Appendix—Case Reports

Case 1: Male aet 23. "Anxiety state." R.S.B.T. result: complete remission. This patient complained of feelings of inferiority which had progressively interfered with his social and working life for upwards of three years. From being always quiet and reserved with few friends and maintaining a rather cold austere attitude to people with whom he came in contact, he developed an increasing sensitivity towards the potential stresses of his environment, feeling on the one hand that people were passing remarks about him in the street and on the other hand that such remarks were justified on account of his own sense of inadequacy and inferiority. His attitude of reserve increased, as did his ideas of reference and his hypersensitivity. His mother reported that he began talking to himself and that he appeared progressively more depressed, anxious and upset.

The patient is the only child of parents who separated when he was one year old and no further contact with the clever but irresponsible father has been possible since then. His mother, aet. 51, is a conscientious, industrious, rather fussy individual who had a "nervous breakdown" two years after marriage. His birth was difficult because of a persistent breech presentation, he was breast fed for six months and experienced some fears of the dark and of strangers as a child. School was endured rather than enjoyed; he was never good at games and mixed poorly with other boys. He proved himself to be an average scholar, leaving at an age of 16 to become a clerk. Sexually he was relatively inactive: he practised masturbation infrequently from the age of 15 and admitted to a solitary heterosexual experience "to prove that he could."

Psychiatric examination revealed an anxious young man of average intelligence who was eager for reassurance but persistent in his paranoid emphasis despite it. No evidence of hallucinations were elicited, rapport was fair and affect was well displayed. Physical examination was negative.

Following an outpatient consultation, where a diagnosis of probable schizophrenia simplex was made, the patient was admitted to hospital for investigation and, shortly afterwards, entered the R.S.B.T. assessment and treatment programme. Oximetric analysis revealed a just adequate capillary oxygen saturation of 92.4 per cent. and an excessively labile stress responsivity score of +34. A course of 18 R.S.B.T. had the effect of raising the saturation level to 94 per cent. and lowering the responsivity score to within the normal range (+28). He was discharged symptom-free after five weeks in hospital and has been seen in out-patients since then. He has remained well to date, 25 months after his discharge from hospital.

Case 2: Female aet 23. "Neurotic Depression." R.S.B.T. result: complete remission.

This patient was referred to hospital following a suicide attempt and a long history of recurrent depressive attacks occurring in settings of relatively mildly stressful situations. The present illness began 15 months ago with an increase in the severity of the attacks, increasing anxiety and tension, difficulty in concentration and a series of serious suicide attempts followed by intense guilt when she recovered consciousness. The apparent reactive factor here seemed to be an unsuccessful love affair. Patient was the second child of a family of five whose parents are alive. Her father was a good provider but cold and unaffectionate; her mother was cyclothymic and felt to be rejecting. A history of actual suicide is present in the collaterals. The patient was healthy until aet. 3 when, following attacks of pneumonia, mastoiditis and measles, she became fearful, was subject to temper outbursts and nail biting and commenced a long series of somatic disturbances and hysterical symptoms. Her personality became that of an over-dependent, chronically anxious and hypochondriacal girl, pre-occupied with her health and who was subject to mood swings.

She was treated by intensive psychotherapy for two months as an outpatient and then admitted to hospital after she was found unconscious with her wrists and throat slashed. In-patient psychotherapy was commenced on a daily basis but was abandoned because of lack of apparent improvement after a four month's trial period.

Referred as a possible candidate for R.S.B.T., the patient was found to have a resting oximetric status of 92.7 per cent. capillary oxygen saturation and a "neurotic" responsivity score of —3. She was given a course of 20 treatments which brought these values up to 97 per cent. and +16 respectively and was accompanied by a disappearance of her depressive affect, a marked lessening of her anxiety and tension and a decided improvement of her general health and outlook on life. She was discharged from hospital two weeks after completion of her treatment course and was still enjoying freedom from her psychiatric symptoms when followed up nineteen months later.

Acknowledgments

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The Role of Psychic Phenomena in Mental Disease

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"Most writers have chills and fevers, aches and pains, nausea at times when they are engaged in composition; and contrariwise they are aware to what morbid states of their body they owe many of their happiest inventions. Knowing that many of their deepest emotions, many of the reflections seem to come straight from heaven, may be due to want of exercise of a sluggish liver, they can hardly fail to regard their spiritual experiences with a certain irony."

W. Somerset Maugham, THE SUMMING UP, p. 260.

The subject of my discussion will be limited to "functional" mental diseases. They are here defined as disease syndromes of doubtful etiology in which mental symptoms dominate the clinical picture. The current theories relative to their causation fall into two groups, (1) physiogenic and (2) psychogenic. The first group has its strongest proponents in continental Europe, the second in our own country.

Psychogenic investigations and therapeutic procedures have been time consuming and costly both to the patient and to the training psychiatrist. It is important, therefore, to determine whether the results have justified the effort and whether psychologic methods are the proper road to the cause and cure of functional mental disorders. It is the purpose of this article to present some reflections towards a more precise evaluation of the role of psychic phenomena in these disorders. The question of causality cannot be considered solved until the primary etiologic factor has been discovered. Precipitating, contributing or aggravating factors, whether psychologic or physical, are secondary and should not be equated with the primary cause. While psychic elements play a role in every human experience including disease, and occasionally if severe enough, may constitute the primary cause, there has been a tendency in American psychiatry to exaggerate and misinterpret their role to the detriment of psychiatric progress.

The intangible nature of psychic phenomena renders their clinical and experimental evaluation difficult. The problem may be approached indirectly by posing two questions: (1) Do psychogenic psychiatrists know where they are going? (2) What have been their practical therapeutic achievements thus far? To answer the first question let us survey briefly some of the many schools of psychogenic psychiatry which have appeared during the past sixty years. Each psychogenic school has sought to encompass within one system the entire range of normal and abnormal behavior. Each offers a master key to the secrets of the psyche. To Freud such a key was to be found in the libidinous energy of the sex instinct striving in the depths of the unconscious against the forces of the superego. To Jung the key lay in all current and past conflicts in the mystic sea of the personal and racial unconscious. To Adler it was the striving for achievement and recognition under the spur of social inferiority. To Rank it was the trauma of birth and separation from the mother repeated in all subsequent privations of the soul and the flesh. To Sullivan it was the mother who initiated the chain reaction of mortal woe by presenting the infant with a confusing assortment of good, bad and wrong "nipples-in-the-lips."[1] E. Fromm and K. Horney pointed the accusing finger to the complexities and stresses of culture. Each school rejects the basic tenets of the others. A. Meyer, not wishing to offend anyone, accepted what he could without blushing from all schools and with his characteristic yearning for efficiency classified all mental ills on the basis of the patient's capacity to work.

The cross currents of psychogenic psychiatry are not limited to interscholastic differences. Each school has cross currents of its own. Finally, each psychiatrist has his special predilections for one or another facet of his particular school. In the presence of this intricate labyrinth of roads leading to the will-o'-the-wisp riddle of the psyche, the most that can be said in their favor is that persons do have sexual, family

and social problems, which each attempts to solve in his way—sometimes a la Adler, sometimes a la Freud. To the question whether psychogenic psychiatrists know where they are going the answer cannot be yes.

In seeking an evaluation of the therapeutic results of psychologic healing we must bear in mind the contention of its proponents that functional mental disorders are psychologically induced and that psychologic therapy is causally directed. One would expect, as in other causally directed therapies, a high degree of effectiveness. Since psychoanalysis is the major exponent of this method, it is proper to examine its record of therapeutic achievement. In the absence of comprehensive statistics on this subject perhaps a survey made by L. S. Kubie[2] of private psychoanalytic practice in this country will indicate an answer. Kubie found that in 1949 there were in the United States altogether 3,577 persons under analysis by recognized analysts and analytic students under their supervision. Assuming the neurotic and prepsychotic population seeking ambulatory therapy to be three million, we find a little over 0.1% of them receiving it by way of the orthodox analytic technique. It is obvious from Kubie's survey, particularly in view of the interminable duration of analysis, that the Freudian method carries little practical promise to the great majority of functionally ill persons. It is doubtful whether the therapeutic record of other schools is less disappointing.

Proceeding now to specific dynamic formulations of the psychologic schools, it is difficult to accept as pathogenic to a person his reactions to such vital processes as biting, eating and elimination which have been a part of animal life since its inception. Nor such social phenomena as sex drive, sibling rivalry and physical and psychologic inferiority of the young in relation to the grown. Frustrations in all these functions are a normal and necessary process of maturation. They are no more responsible for mental illness than is running up a flight of steps responsible for heart disease. They serve, rather, as a test of the organic strength or weakness of the individual. Biting, for example, is as necessary to the growing teeth as exercise to the growing muscles and both are exercised in play in all mammalian species. If in the process of exercising these functions an individual works up a thwarting degree of anxiety, this is more likely the result of a defect in his internal environment rather than the severity of his external environment. That normal individuals, adults and children alike, are able to endure an extremely wide range of emotional stresses and frustrations without serious damage to the psyche was demonstrated during World War II when, contrary to the anticipations of the psychogenic schools, no increase in mental illness was noted in such countries as England, Germany and Japan.[3]

It is generally accepted that there are innate differences in the sturdiness of the skeleto-muscular system. It is also conceded that intellectual capacities are largely innate and can be modified only to a minor degree by environmental factors.[4] But in the case of affective processes psychogenic psychiatry insists upon the external environment as the major molding force. And yet the autonomic nervous system and the visceral cerebral centers which subserve affective functions are phylogenetically older and should be expected to be more resistant to environmental influences. That affective processes are correlated with organic change is evident from the wide gamut of affective experience in childhood, adolescence, maturity, senescence, menstrual cycle, menopause etc. Moreover, many of the manifestations of affective change such as disturbances in sleep rhythm, anorexia, adynamia, rage and pugnacity have been reproduced in animal experiments with the diencephalic structures. According to Hess[5], the rage reaction observed by him on electrical stimulation of the hypothalamus is not sham but real rage. Particularly significant for psychiatric application is his statement: "The internally created state of emotion identifies an external object as the source of emotion and may attack it. The rage mechanism induced by hypothalamic stimulation becomes projected to the outside world and blended with an exogenous visual perception."

The fundamental importance of affect has been appreciated by all psychiatrists. Jung summarizes the subject in these words: "The

essential basis of our personality is affectivity. Thought and action are only, as it were, symptoms of affectivity."[6] The prime example of the ravages wrought in the psyche by change of affect is the manic depressive group of psychoses. With the evolution of a mania or a depression, the stream of thought follows closely and harmoniously the change in mood. With the mood as his master and with the primordial human faculty of seeking the why of everything, the depressed patient begins to explore the secret recesses of his past and soon discovers sufficient "history" to justify the mood. The feeling of guilt becomes commensurate with the depth of despondency in the framework of the patient's intellectual, educational and experiential resources. Like a beam of lurid light, the dismal mood scans the psychic sky, resting on real or fancied events of the past in harmony with its quality. One simple charwoman, whose past and imagination were unable to conjure up any misdeeds, condemned herself for loss of capacity to work to the point of seeking to end her life. Often the patients will go back ten, twenty or even fifty years into their past for appropriate transgressions which to a healthy individual may be a source of boasting (Table 1). The long incubation period, the relatively trivial nature of transgression and the severity of the sentence imposed are difficult to explain psychodynamically. Nor is the tracing back to still earlier guilt material of childhood more convincing. The guilt rationalizations become understandable if we reverse the causality and seek the origin of the process in the affective neuro-endocrine mechanism of the patient's internal environment leading to morbid psychologic productions as epiphenomena.

Equally unsatisfactory are the psychogenic theories of delusions and hallucinations. The helplessness of psychotherapy in dealing with these basic symptoms should lead us to look elsewhere for their cause. Certainly hallucinations should be regarded as symptoms of serious organic disturbance. Clinical experience in such states as toxic and infectious deliria has demonstrated the relationship between hallucinations and a severe organic process. Animals, which have no superego in the human sense, experience visual and probably other types of hallucinations.[7]

Schizophrenia is so protean in its manifestations that it should occasion no surprise if it imparts some of its qualities to the bewildered psychiatrist. No less an authority than Bleuler seemed to have fallen prey to such confused thinking. In his work on the subject he speaks of schizophrenia as being psychologically determined. A few pages further he says: "But the chronic catatonic symptoms undoubtedly have such a bad prognostic significance that it is tempting to believe that they are the expression of some severe brain process."[8] Why not yield to the temptation?

To this writer it is tempting to accept the theory that the so-called weakness of the ego in schizophrenia is not psychogenic but is related to a disturbance in the orderly integration of impulses reaching higher levels from body viscera by way of the interoceptive pathways. This concept to which French writers refer as coenesthesia[9] (koinos—global), may cast light upon visceral delusions and their projection into paranoid ideation in line with Hess' diencephalic observations.

The dual aspect of nerve tissue—physical and psychologic suggests an analogy to a

TABLE 1—*Six Consecutive Cases of Depressive Psychosis in Private Practice.*

Case	Sex	Age	Incubation	Severity of Depression	Guilt Material
1	F	35	22 yrs.	Suicidal urge	Masturbation
2	M	39	17 yrs.	Suicidal attempt	Illicit sex relations with pregnancy in the girl and financial settlement
3	F	55	8 yrs.	Two suicidal attempts	Administration of "excessive" doses of opiates to her husband dying of cancer
4	M	55	10 yrs.	Suicidal attempt	Falsifying production records at work to increase his annual bonus
5	F	45	30 yrs.	Suicide by hanging	Masturbation
6	F	68	50 yrs.	Suicidal urge	Sexual relations prior to marriage

musical instrument—mechanical and acoustic. Just as the acoustics are affected by the slightest change in the form or material of the instrument so physico-chemical alterations in the nervous system will be reflected in psychologic processes. To one subscribing to the axiom that there can be no functional change without structural change, however fleeting, it is more reasonable to accept a lower threshold of sensitivity in the neuroendocrine system as the basis for anxiety which, in turn, leads to inadequate management of life's stresses[10] rather than the reverse. By the same token it is more reasonable to accept the manic depressive psychoses as a constitutional disturbance on the affective level rather than as an expression of cannibalistic proclivities towards the parents.[11] And to regard bronchial asthma as an imbalance in the autonomic innervation of bronchial musculature inherited according to Mendelian principles rather than as a suppressed cry for the mother.[12] And to interpret dreams in asthmatics of caves and closed places as being the result of respiratory distress rather than of intrauterine phantasies.[13]

If abnormal psychic phenomena result primarily from disturbances in the physiology of the nervous system, then what is their role in psychiatry? It is threefold: (1) Their investigation uncovers the logic and course of psychic processes under abnormal physiologic conditions and points to the nature of the disease in the same manner as physical symptomatology points to disturbances in other bodily organs. (2) Familiarity with them serves as the principal avenue of rapport between the patient and the physician by contributing to understanding and empathy. (3) They help to assess the patient's psychic potentialities and thereby to aid him to function socially within the limits of those potentialities.

Summary

An attempt is made to evaluate the role of psychic phenomena in functional mental diseases. Evidence is presented in support of the theory that abnormal psychic phenomena have their roots primarily in the patient's internal rather than the external environment and that psychologic material with which the patient comes to the psychiatrist is for the most part symptomatic of an underlying constitutional defect or a neurophysiologic disturbance. Therefore, psychotherapy of all schools should be regarded as symptomatic and not causal and the term psychotherapy should be separated from the magic halo with which it has been invested by the psychogenic schools of psychiatry.

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Study of Adjustment to Long-Term Hospitalization Among Tuberculous Patients

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Introduction

This is a preliminary report on the study of adjustment to long-term hospitalization among tuberculous persons and particularly on a notable finding ascertained therefrom which suggests a relationship between the patients' ability to verbalize emotional reactions and their ability to meet hospital adjustment. The report is part of a broader exploration of the personality features of tuberculous individuals at the Memphis V. A. Hospital having a psychosomatic program in the comprehensive care of patients.

Long-term hospitalization for tuberculosis or other chronic illness invariably taxes to the utmost the psychological and other resources of the patient. The hospitalization itself may precipitate various undesirable behavioral reactions, which become aggravated by prolonged hospital stay. Each patient meets this chronic stress in his own way, favorably or adversely adjusting to the hospitalization. There are, of course, many other psychic processes provoked in such a situation but they will not be considered at this time.

The problem of premature interruption of hospital treatment for tuberculosis is of grave concern because the percentage of patients interrupting treatment prematurely is high. This results in ineffective care of patients as well as poor public health control of tuberculosis, waste of medical and hospital facilities, and a high toll of human suffering.

Procedure

A series of 94 male tuberculous patients admitted to the hospital was studied for the period October 11, 1953 to January 5, 1954. Patients too ill for psychological testing were not included. There was no other basis for selection of the population investigated. The patients were interviewed during the first week of hospital admission. Basic personal data were obtained concerning race, age, marital status, education, occupation, length of illness, length of previous hospitalization, number of previous hospitalizations, number of previous irregular discharges, and whether the tuberculosis was adjudged service-connected.

At the first interview group psychological tests were administered. These tests included the Shipley-Institute of Living Scale, the Rorschach and a sentence completion scale specially devised for tuberculous patients by one of the authors. The Shipley-Institute of Living Scale, an intelligence test, was used to denote the patients' level of language ability. The Rorschach was used as an index of the patients' magnitude of emotional expression. Finally, the sentence completion scale was used to measure ability to verbalize reactions experienced by the patients.

Each patient's hospitalization status was reviewed six months after admission. The 94 patients were divided into two groups: (1) in-patients and regular discharges of which there were 46; and (2) irregular discharges of which there were 48. The two groups, each about equal in number, were compared as to their basic personal data and the various psychological test indices.

Results and Discussion

Twenty-eight of the irregular discharge group were service-connected for tuberculosis as contrasted with twenty-two of the in-patient and regular discharge group. There were no significant differences between the groups with respect to race; virtually the same ratio of one Negro to three white patients held for both groups. The average age of the in-patient and regular discharge group was somewhat higher than that of the irregular discharge group, 39.3 as compared with 36.8 years. The irregular discharge group contained more married men than the in-patient and regular discharge group. Both groups had approximately the same average

From Crump Veterans Administration Hospital.

educational achievement, a grade of 9.4 for the in-patients and regular discharges and 9.7 for the irregular discharges. There was some difference between the groups as to occupational level in that more irregular discharges were classified in clerical and sales and unskilled categories and fewer in agricultural occupations. From the time of the initial diagnosis of tuberculosis, the average length of illness of the irregular discharge group was more than twice that of the in-patient and regular discharge group, 66.8 months as against 31.4 months. The average number of previous hospitalizations of patients in the irregular discharge group was 2.7 and the total months of previous hospitalization were 11.3 compared with 1.6 and 9.3 respectively for the in-patients and regular discharges. The average number of previous irregular discharges was 1.8 for the irregular discharge group and 0.83 for the in-patient and regular discharge group. There were 28 patients in the irregular discharge group who had one previous irregular discharge or more in contrast to 22 patients with such discharge in the in-patient and regular discharge group.

The results of the psychological tests were also analyzed in the two groups. On the Shipley-Institute of Living Scale, a vocabulary score of 23 was considered the minimum for adequate language ability. Thirty of the irregular discharge group were found to have inadequate language ability in contrast with 24 of the in-patient and regular discharge group. Since inadequate language ability in the patients would interfere with performance on the Rorschach and sentence completion tests and because those tests were used in this study to measure ability for verbalizing personal reactions, it was decided to eliminate such patients totaling 54, and to study further only the 40 remaining patients having adequate language skills.

It was also important to eliminate the group with inadequate language skills on the assumption that obvious inability to perform adequately on the criteria for verbalizing personal reactions may indicate a psychological influence rather than a deficiency of language ability in the cultural sense. Also, the fact should be noted that not all persons with adequate language ability, and hence with the skills to express themselves, do well on criteria for ability to verbalize reactions. We may thus assume that for various psychological reasons such persons prefer not to verbalize their reactions or else unconsciously can not do so.

The patients with adequate language ability were then studied to determine the relationship between performance on the criteria for ability to verbalize personal reactions and the status of hospitalization. Statistical analysis of that study revealed that tuberculous patients having adequate language ability are unlikely to interrupt prematurely their hospital treatment if they are able to express their psychological reactions—to verbalize their thoughts, attitudes and feelings about their tuberculosis and other problems.

The complete statistical findings are not included at this time.

Summary

The results of this study indicate that the tuberculous patient who interrupts his hospitalization against medical advice, as compared with the tuberculous patient who continues hospital care, is somewhat younger, more likely to be married, more often in an unskilled occupation, and service-connected for his illness. He also has been ill about twice as long as the patient who abides by medical recommendations for hospital stay, has had a somewhat greater number of both previous hospitalizations and irregular discharges, and a slightly longer total hospitalization. More often, he is inadequate in language skills and lacks the verbal ability for expressing his psychological reactions. The better the patient's ability to verbalize, the more likely that his hospitalization will continue and that he will not resort to irregular discharge. This finding, not yet fully understood, is enlightening and not surprising to anyone acquainted with psychotherapeutic procedures, particularly the value of ventilation of psychological problems. Facing situations fraught with marked emotional stress, the tuberculous patient needs help in dealing with his emotional experiences, if he is to abide by recommended hospital treatment. When such need is not met, he may be expected to resort to another solution which

usually eventuates in his actually abandoning the apparently unbearable source of his difficulties, the hospital itself.

Implications of Findings

From the present study, it is possible to express the following implications:

1. The inability or unwillingness of patients to verbalize their reactions should alert the hospital staff strategically to suspect those patients in particular as likely candidates for irregular discharge.

2. Total therapeutic effectiveness in chronic illness such as tuberculosis requires the patient's preparation for emotional adjustment to hospital life, to reactions toward the disease and treatment, and to other problems.

3. Good doctor-patient rapport is indispensable in aiding the patient to communicate personal reactions and in promoting the patient's maximum hospital benefits.

4. Interpreting psychodynamically, we may presume that the patient who can verbalize his emotional reactions can thereby discharge pent-up tensions and make a conscious attempt to deal with his reactions and problems on a realistic basis. His better ability to ventilate freely and frankly serves better adjustment to long-term hospitalization. On the other hand, if the patient's verbalization is inhibited, his tensions mount and ultimately culminate in his resorting to irregular discharge. Thus, the patient's ability to verbalize may be considered an index of his ability to adjust to his hospitalization.

Comparison, In-Patient and Regular Discharge Group and Irregular Discharge Group

VARIABLE		Inpt. & Reg. Discharge Group (46)	Irreg. Discharge Group (48)
RACE	White	34	37
	Negro	12	11
AVERAGE AGE		39.3 Years	36.8 Years
MARITAL STATUS	Single	14	9
	Married	22	30
	Separated	3	3
	Divorced	5	4
	Widowed	2	2
AVERAGE EDUCATION		9.4 Grades	9.7 Grades
OCCUPATION	Prof. & Managerial	5	2
	Clerical & Sales	4	7
	Service	1	1
	Agricultural	14	9
	Skilled	7	8
	Semi-skilled	6	7
	Unskilled	4	10
	Student	5	4
AVER. LENGTH OF ILLNESS		31.36 Months	66.79 Months
AVER. PRE. HOSPITALIZATIONS		1.59	2.66
AVER. TOTAL LENGTH OF PRE. HOSP.		9.32 Months	11.29 Months
AVER. PRE. IRREGULAR DISCHARGES		0.83	1.18
PTS. WITH PRE. IRREG. DISCHARGES		22	28
SERVICE CONNECTED PATIENTS		22	28
ADEQUATE LANGUAGE ABILITY		22	18

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Integration of Shock Treatments and Psychosurgery in Schizophrenia

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In all countries schizophrenia continues to represent the bulk of the mental hospital population. This has not changed, although during the last 20 years several treatment methods have been introduced for schizophrenia: insulin, convulsive treatments with metrazol and electric current, and psychosurgery in the form of prefrontal lobotomy and its numerous modifications. Each of these treatments gives results in individual cases which were unseen earlier. Yet, the overall picture of cures or remissions in schizophrenia remains unsatisfactory. This is explained in part by the fact that none of these treatments is specific for schizophrenia. Of greater concern to the psychiatrist working in this field is the definite impression that the available treatments are not utilized to their fullest extent. The individual treatments are not always applied with adequate techniques and not for a sufficiently long period of time. Frequently, a psychiatrist specially interested in one of them, will over-emphasize this one treatment and neglect the others. The fact that several treatments are now available none of which is fully satisfactory, makes a proper integration of the various methods imperative. It is the purpose of this paper to point out how they can be applied most adequately individually, how they can be combined, and what their respective indications are in the various psychiatric syndromes which are conceived as a disease entity under the term "schizophrenia".

To begin with the shock treatments, both insulin and convulsive treatments were invented for schizophrenia. The striking results of convulsive therapy in the affective disorders led to the assumption that insulin treatment is the only proper method for schizophrenia, and that the convulsive methods must be limited to the affective disorders. This is incorrect because both treatments are of therapeutic value in schizophrenia. Many feel that insulin is superior. This may be, but large statistics on insulin, metrazol and electric convulsive therapy show convincingly that wherever any of these treatments is given by experienced workers here or abroad, results are very much the same regardless of the type of treatment applied.

It is true that some statistics for both insulin and convulsive treatments show improvement rates that are not superior to those listed in untreated cases. In insulin treatment the two main reasons for unsatisfactory results are an insufficient total number of comas and an insufficient depth of the coma in each treatment. In convulsive therapy a poor technique hardly interferes with the effectiveness of the individual treatment. While insulin treatments often remain at the subcoma level and, thus, cannot be counted as actual coma treatments, an electroshock treatment usually leads to a true convulsion but newer modifications make it necessary to revise the statement that every shock treatment is a convulsion. Aside from subconvulsive, so-called electrostimulatory treatment which is no treatment for schizophrenia, these techniques frequently elicit only a general muscular contraction but, unnoticed by the therapist, fail to produce a true convulsion. They suppress the clonic phase by continued stimulation of the brain during the entire time or part of the convulsion. This is especially true for electric narcosis and the Reiter technique. In ordinary ECT the most frequent mistake is too small a number of convulsions. Patients who respond to convulsive treatment at all, usually show optimal results after as few as 3 or 4 treatments but they hardly ever keep this improvement unless the treatments are continued up to 20 or more applications.

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This is the most frequent mistake, although all workers with a large experience agree on the need for a minimum of 15, 20 or more treatments if results are to approximate those obtained with insulin therapy, where 40 to 80 hypoglycemic comas are required. Discrepancies in some statistics on convulsive therapy among hospitals with the same type of material can often be explained by the difference in number of treatments. In statistical evaluations the average number given to a large group of schizophrenics is meaningless because cases entirely unresponsive to treatment often received an unduly high number of treatments, while the favorable cases are undertreated.

Many wrong conclusions in the field of the treatments under discussion are due to statistical misinterpretation. Even though every experienced psychiatrist can easily convince himself of the effectiveness of these treatments, as limited as it may be, the statistical approach is necessary. Statistics on mixed material in schizophrenia are valueless. The material must be broken up according to duration of illness and possibly the type of onset of the psychosis. Most statisticcs by experienced workers show remission rates in schizophrenics treated with any of these treatments that are twice as high as they are in spontaneous remissions. Results are favorable only in patients who have been sick less than one year after which time the figures for remissions decline sharply. The need for early treatment with shock methods is unquestionable. The various subtypes of schizophrenia respond in different ways, a fact which is of primary importance for the decision how intensively shock treatments must be applied before psychosurgery can be considered. Catatonic excitement represents by far the best indication for any of the shock treatments. This includes the cases which were formerly described as "fatal catatonia" where dehydration and fever endanger the patient's life. In these cases ECT yields faster and often fully satisfactory results without recourse to insulin. Catatonic stupors are wrongly considered the primary indication for ECT. While this method is always satisfactory for a symptomatic breaking up of the stupor, long-term results are disappointing, and in the majority of cases insulin has to be given. On the other hand, paranoid schizophrenia cannot be considered the exclusive domain of insulin treatment as has often been done. Acute paranoid schizophrenia in the younger age group responds well to ECT, although in cases of failure insulin should always be added. In late paranoids and those cases diagnosed as either paraphrenia or involutional psychosis paranoid type, ECT is more often unsuccessful but, unfortunately, insulin which must be limited to cases where age and cardiovascular changes do not contraindicate the application of hypoglycemic comas, is often equally disappointing. This is particularly true for those cases in this group where the total personality is well preserved. It is a striking clinical experience that patients with acute symptomatology and disintegration of the personality structure respond much better to shock treatments than those in whom the total personality remains well preserved in spite of their psychosis. In this type of patient it is needless to lose time with repeated series of shock treatment before psychosurgery is being considered because here lobotomies yield excellent results. The same is true for another group of patients in whom the total personality remains well integrated, namely the pseudoneurotic form of schizophrenia (Hoch and Polatin). These patients in whom neurotic symptoms dominate the clinical picture and only closer scrutiny permits to reveal schizophrenic features, are entirely unresponsive to shock treatments with the exception of some depressive episodes in the course of their illness for which ECT will give symptomatic relief. Final results in pseudoneurotic schizophrenia are equally unsatisfactory with insulin as with ECT. Probably psychotherapy has its best indication in this group of schizophrenics, but the overall results are almost as unrewarding as with shock treatments. Therefore, none of these treatments should be continued indefinitely since experience with psychosurgery has given an entirely new outlook for this group of patients. The least satisfactory results with any of the shock treatments are obtained in those types classified as "simple" and "hebephrenic." Although statistical results are low, both insulin and ECT should

be applied intensively, preferably in the form of combined insulin-electric shock treatment. Both these methods are still far from our goal in the treatment of schizophrenia, therefore the combination is apt to give the best results. If several courses of ECT have shown only temporary remissions, some workers prefer the intense or regressive ECT by giving one or several treatments daily and inducing a deep temporary organic dementia. Although remissions after this procedure are usually longer, the only merit seems to be the very large number of convulsions. In those who show at least a temporary response treatment should not be stopped with the intense type of ECT but insulin coma treatment combined with some electrically induced convulsions should always be instituted. In simple schizophrenics and hebephrenics this is all the more necessary as psychosurgery achieves comparatively little in this group because of the frequent and often severe deterioration of these patients. Therefore, while in the non-deteriorating types of schizophrenia such as the late paranoid and pseudoneurotic form repeated courses of shock treatments are hardly necessary before psychosurgery is being considered; the simple and hebephrenic type should be treated with shock treatments as long as they show even the slightest improvement.

Many schizophrenics who respond with fairly good remissions, relapse. In such cases renewed courses of shock treatment are definitely indicated because those patients who have responded once, usually respond again, though the remission may be on a lower level and the symptom-free periods may become shorter. Those who do not respond anymore for any length of time, can be kept on maintenance treatment with ECT which can be given as often as once a week over an unlimited period of time. The great value of maintenance electric shock treatments for the management of the patients and the morale of the backwards in our mental hospitals is unquestionable but its indications are limited since the advent of psychosurgery. In any schizophrenic patient in whom the hope for a lasting remission under shock therapy, or for that matter, for a spontaneous remission has been abandoned, psychosurgery should be considered.

There are some fundamental differences between the effect of shock treatments and of frontal lobe surgery in a schizophrenic patient. In favorable cases shock treatments are apt to remove almost the entire symptomatology of the psychosis. This is unusual in favorable psychosurgical cases. Psychosurgery removes anxiety and, thus, has an effect on the impact of the symptoms on the patient but it frequently leaves the symptoms themselves untouched. A patient who after a series of shock treatments begins to hallucinate again, will usually relapse completely into his previous psychosis, while a patient who after psychosurgery becomes again delusional or hallucinatory, may well continue to be considerably better than before the operation, and is not apt to become worse. He will rather improve as time goes on, and it is a frequent observation that patients with only a slight improvement shortly after the operation, will improve further over a period of one, two or even more years, an observation which is quite contrary to clinical experience in shock therapies. This is of practical importance when smaller operations have been performed, and the question of reoperation arises. While shock treatment should be reinstated with the first sign of a relapse, it is definitely advisable to wait with further and larger psychosurgical procedures for a considerable length of time.

There is no standard answer to the question when psychosurgery should be performed in a given schizophrenic patient. Each case must be judged individually, and only general rules can be established. It is no longer considered good judgment to wait for years until the patient is deteriorated to a point of no return. While in the beginning of the psychosurgery era the large operation of standard lobotomy was reserved for patients who had been sick for many years, it is now recognized that schizophrenic deterioration is rather a deterrent from frontal lobe surgery in view of the additional personality changes caused by the larger operations which are, unfortunately, often necessary in more chronic cases. While shock treatments are indicated in every single schizophrenic, even though the treatment

prognosis may be poor, psychosurgery is definitely not indicated in every schizophrenic unresponsive to other treatments. The first question in a patient presented for consideration of psychosurgery should always be whether shock treatments have been applied adequately. There is no evidence that shock treatments, as has been claimed, lower the emotional tension and, thus, diminish the chances for a good surgical result. On the other hand, there is no need for repeated courses of insulin or ECT in a patient who did not even show a temporary response to these methods. There is also no need for shock treatments in such cases as the pseudoneurotic schizophrenics, where psychotherapy rather than shock treatments should be requested as the treatment of choice prior to the surgical methods.

Next to the question of adequate shock treatment, an important feature to be considered is the patient's prepsychotic personality. If prior to the psychosis the patient already showed a poor social or emotional adjustment, the prognosis will be marred by his unfavorable personality traits. In patients, where the degree of schizophrenic deterioration together with a long duration of illness and poor emotional responsiveness make the indication for psychosurgery already questionable, an inadequate prepsychotic personality might be a decisive factor against the operation. Lists of symptoms which are relieved best by psychosurgery have been given by various authors. They contain such symptoms as anxiety, tension, suicidal and homicidal tendencies. Delusions and hallucinations are often uninfluenced. An unexpected observation is that mannerisms, stereotypes, giggling may disappear and are not as unfavorable as they had been believed to be in the over-all prognosis of a schizophrenic patient. Depersonalization has been described as a symptom easily influenced by psychosurgery. An outstanding symptom which often remains uninfluenced and, if the only symptom present, should not be considered as indication for psychosurgery, is depression in whatever setting it occurs. Chronic depressions with agitation, hypochondriacal and other symptoms, however, may show a favorable outcome.

Psychosurgery will be usually preceded by shock treatments, but in some cases shock therapy might be applied after the operation. In our own material, where shock treatments have been applied intensively prior to the operation, there was rarely an indication for such postoperative shock treatments. A case of status epilepticus after the first electroshock treatment in a post-lobotomy patient makes us hesitant to recommend a wider use of ECT after psychosurgery. However, in some cases residual symptoms such as depression or recurrence of some schizophrenic symptoms present indications for shock treatments after the operation.

Available statistics on psychosurgery show even more shortcomings than statistics on shock treatments. Institutional material mainly drawn from the back wards of a mental hospital will necessarily give lower figures than material from a hospital with voluntarily admitted patients, where pseudoneurotic and other non-deteriorating schizophrenics are more widely represented.

Experience with psycho-surgery has shown that the entire picture of the psychosis can be influenced by a purely symptomatic change such as the reduction of anxiety. It therefore can be hoped that the same reduction of anxiety can at some future day be achieved by chemical means. Chlorpromazine (Thorazine) may accomplish this but the improvement is only temporary; therefore it is too early to speak of a "Chemical Lobotomy." As long as we need shock treatment and psycho-surgery, it must be our goal to use them as adequately as possible. A better integration of the methods available and a proper evaluation of all pertinent factors in a given patient at a given stage of his illness would improve results with the methods available today.

Book Reviews

CLINICAL NEUROLOGY by Bernard J. Alpers, M.D., F. A. Davis Company; 896 p. $9.50 (1954).

The present third revision, the original edition of which had first appeared in 1945, provides in the main, a practical and advanced clinical presentation of the neurological conditions the practitioner commonly meets, and as arranged, should also afford undergraduates and residents a clearer understanding of the subject. The book has been subdivided into 22 chapters, the first three of which develop the general principles of neurological examination, interpretation, and topical diagnosis of nervous disease. The remainder of the book—some 700 additional pages—deals with some of the more usual affections. It traces their inceptions, whether arising within the nervous structures per se, or whether resulting from vascular disorders, neoplastic infiltrations, trauma and sequelae, noxious agents, endocrine or autonomic system malfunction, congenital and developmental disorders involving the neuraxis.

Throughout the book, names of authorities have been generously embodied within the textual material, although bibliographic references for those readers who may desire to delve further into the subject, are entirely lacking. In the author's descriptions of the various disease processes, basic neuro-anatomy is rather meagerly reviewed respecting cranial and peripheral nerve derivation, course, and particularity of distribution.

A random sampling demonstrates that the subject of poliomyelitis has been well and authoritatively presented. However, as to treatment in cases where the patient's defective cooperativeness prevents maintenance of postural drainage, or where the patient's severe fatigue may threaten his life, no reference or suggestion of life-saving tracheotomy has been made by the author. The subject of angiography has been dismissed by a short paragraph of less than 50 words. In discussing the distinguishing features of epileptic and convulsive seizures, the author might have enhanced the value of his discussion of visceral auras by describing the vasovagal syndrome and the distinguishing features of the attacks.

The book provides generous clinical information from the standpoint of etiology, pathology, symptomatology, differential diagnostic features and suggested recognized therapeutic methodology. The text includes much and strategically placed, well selected illustrative material. The author, as a capable clinician and masterful writer, has again succeeded in presenting in clear, simple and direct language, the third edition of his text book of clinical neurology, concluded and enriched by a well-arranged index.

The book is a praiseworthy addition and contains a wealth of clinical material and information which should enable both undergraduate and practitioner to keep abreast of the clinical and therapeutic advances in the subject of neurology.

MODERN CLINICAL PSYCHIATRY by Arthur P. Noyes, M.D., W. B. Saunders Company, 609 p. (1953).

The book represents the author's most recent contribution as a fourth revision of a long-recognized standard work. While it is not easy to single out any one chapter for special excellence, a few characteristic chapters and features will be exemplified as an indication of the book's value.

The present volume has been enlarged over the previous edition by some 84 pages of material; and although set in smaller type is as clearly and as easily readable as the several former editions' larger type format.

The detailed classification of psychiatric disorders officially adopted by the American Psychiatric Association in 1952, has been categorically reproduced. In general, comprehensive discussion of the various manifestations of mental and personality disorders has been presented on the basis of the outlined new nomenclature, except that the single component of the varying personality disorders and/or transient reactions to special stress has not been dealt with as such.

Chapters have been added, and previously-appearing chapter headings have been renamed to conform to our most recent knowledge of genetic and dynamic doctrines as they apply to clinical psychiatry.

The chapter on psychotherapy has been considerably revised, and in addition to the elaborate treatment of its concepts, there has been included for the first time, the modus operandi of group psychotherapy. Here are outlined the non-directive, clinical and didactic methodologies, and the manner of group organization and group therapeusis within varying segmental levels has been detailed.

The chapter on symptoms of mental disorder has also been rewritten, and the material concerned with psychological as well as physiological disturbances productive of memory loss, has undergone considerable descriptive revision.

What was formerly titled "Traumatic Mental Disorders" has been more appropriately renamed under a new chapter-heading "Mental Disorders due to or Associated with Head Trauma." The subject has been treated with clarity, has been descriptively discussed, and is presented in the light of psychogenic complications superimposed upon organic syndromes.

The book is comprehensive, stimulating, and affords a well-chosen and up-to-date bibliography of the subject matter under discussion, at the end of each chapter. In the present improved state of an already recognized text book, it well deserves the title is bears; and, as now in its fourth edition, merits continuance of its earned recognition. It should endure as a valuable addition to the working library of those concerned with clinical psychiatry as the field of choice.

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